

Cross section PR122A was established in 1979 across a new cutoff channel that had formed during the 1978 flood across the neck of a meander bend in Powder River at the mouth of Flood Creek. As the 1978 flood flowed across the neck of the bend, several gullies formed on the downstream bank of the meander neck (see 1979 profile in the PR122AComposite data file), and began cutting their way headward across the neck. One of these eventually succeeded in breaching the neck and diverting the main flow of the flood waters (Gay *et al.*, 1998, *their* Figure 8; Meade and Moody, 2013, *their* Figures 11 & 12). Because the cutoff was completed late in the flood, the width of the new channel remained fairly narrow--45-m on the line of section. Along the right side of the new channel, extending from the thalweg at station 38 to the right bank at station 75 (destined to become a point bar), the initial bed sediment was primarily gravel, plus some sand. The channel was bedrock-controlled, and had a downstream slope of 0.0043 (several times steeper than the average slope of about 0.001 for Powder River).

Between 1979 and 1985 the bank-to-bank width of cross section PR122A increased from 45 to 62 m without much consistent deposition of sediment. In 1985 and again in 1987, layers of sand (0.1-0.6 m thick) were deposited between stations 43 and 76; and then in 1989 an ice flood deposited additional sand and gravel between stations 50 and 75 and this became the foundation of the point bar (Moody and Meade, 2014). More sediment was added to the point bar in 1990, 1993, and 1995, while the channel continued to widen to 90 m (double its initial post-flood width) by 1999. The width has remained stable from 1999 to 2013 with only about 2 m of widening in 2011, while substantial amounts of sediment were added to the point bar in 2002, between 2003 and 2006, in 2008 (0.2-0.5 m thick), and by another ice flood deposit in 2012 creating an irregular topography. The 2013 survey indicated that this ice-related, irregular topography on the point bar had begun to smooth out.

Gay, G.R., Gay, H.H., Gay, W.H., Martinson, H.A., Meade, R.H., and Moody, J.A., 1998, Evolution of cutoffs across meander necks in Powder River, Montana, USA. *Earth Surface Processes and Landforms*, v. 23, p. 651-662.

Meade, R.H., and Moody, J.A., 2013, Erosional and depositional changes wrought by the flood of 1978 in the channels of Powder River, southeastern Montana: *U.S. Geological Survey Scientific Investigations Report* 2013-5035, 28 p., 1 plate.

Moody, J.A., and Meade, R.H., *accepted 21 April 2014*, Ontogeny of point bars on a river in a cold semi-arid climate, Submitted to *GSA Bulletin*.



PR122A. **Top.** 4 September 1978. View upriver through the cutoff showing the bedrock rapids through the new channel formed during the 1978 flood. **Bottom.** 4 September 1978. View downriver of bedrock (coal) rapids. Red line shows approximate location of section PR122A.



PR122A. **Top.** 21 September 1982. View downvalley through a headcut that crosses section PR122A near station -40 (see profile in data files). S. Stewart (~1.5 m tall), in the foreground, is standing on the section and M. Karlinger is standing downriver of section PR122A. **Bottom.** 5 September 1984. View is upriver, J. Moody is standing on the line of section, and the bedrock rapids can be seen at the top of the photograph.



PR122A. **Top.** 4 October 1985. Three overbank deposits on left bank 36 m upriver from section PR122A (top layer is 25 cm thick. **Middle.** 22 September 1987. View is upriver from ~ 20 m below PR122A **Bottom.** 29 August 1991. View is upriver showing the bedrock.



PR122A. **Top.** 10 May 1993. View is upriver from PR122A showing the bedrock rapids at higher flows than previous photos. **Bottom.** 9 June 1993. View is upriver, tripod is on section, and water level is 1008.9 m



PR122A. **Top.** 25 September 1994. View is upriver and J. Moody and tripod are near the line of section. **Bottom.** 26 September 1995. View is upriver and J. Moody is on the line of section.



PR122A. **Top.** 29 September 2013. View is upriver. Rodman (J. Moody) is near station -15 at the edge of the sedge. Tripod and D. Martin are ~6m upriver of station -22. **Bottom.** 29 September 2013. View is upriver. Rodman (J. Moody) is on section near station +15, which is where the edge of the left bank stood in 1984 (Edge of left bank stood at station +31 in 1979).